

show that it could ever have led to them. And all recent attempts to directly apply the results of physical determinations have proved most unfortunately barren of results: a striking example of this is afforded by the complete failure which appears to have attended Thomson's attempt to deal with the vast mass of thermal data accumulated by his unwearied study of carbon compounds. Chemists have not as yet received much assistance from physicists: the determination of physical constants has served to give precision to chemical statements, but little else; and it is not probable that it will ever be otherwise. In fact, the attitude of the two classes of observers towards natural objects is different, and appears to be somewhat as follows. The physicists are much like a party engaged in the investigation of a strange nation: they walk through the streets of its towns and most carefully observe how the houses are externally constructed and arranged, and study the traffic in the streets, but they do not enter the houses or take note of the mental peculiarities of the people. The chemists, however, enter the houses: they observe their internal structure, they determine the influence of this internal structure on the character and occupations of the inhabitants, of whose mental peculiarities they also endeavour to gain clear conceptions. Those chemists who are satisfied to merely cross the thresholds without continuing their studies and researches, and who therefore have much to learn before they can appreciate the labours of their more active and curious brethren, have no right to take upon themselves the functions of law-givers.

Lastly, a few words regarding the illustrations. It will no doubt be said that these are only diagrammatic; that students are to perform the experiments themselves and therefore will become acquainted with the actual apparatus. But even diagrams should be drawn to scale: Figs. 37, 38, and 43, are illustrations which show how frequently this is not the case: if such very wide-mouthed flasks were always used as are pictured in most of the diagrams a small fortune would be expended in corks. An elementary work should be properly illustrated by drawings which fairly represent the actual apparatus, as such a book will necessarily fall into the hands of those who have no knowledge of apparatus, and therefore need guidance.

From our remarks it will be gathered that we entirely disapprove of the "Practical Chemistry" as a book for beginners: we do not recommend it even to more advanced students. Teachers will no doubt be able to cull a few useful hints from it, although there is a striking absence of originality or novelty in all practical details.

We have little to say of the "Elementary Chemistry." It is an infinitely better book than the companion volume, and a fairly advanced student will find in it much information of interest and value not to be met with in any other current work of the kind. But it is not an elementary chemistry in any proper sense of the term, and, as in the companion volume, the attempt is made to crowd far too much matter into the space at disposal.

In expressing our opinion thus plainly, we have been guided by the desire to do something to stem the ever-flowing tide of so-called elementary text-books of chemistry; these are mainly the outcome of the existence in this country of a vast amount of pseudo-chemistry,

and of little true chemistry, and the very existence of such books is doing an infinity of mischief in helping to perpetuate the evil. We believe that it would be of great advantage to chemical science to form an Association to prevent the further publication of elementary works other than such as had been carefully revised and approved of by a Publication Committee of the Association. The harm done by unsystematic and illogical teaching, and by vague experimenting, can never be repaired, and it is incumbent on an author to ponder the meaning and effect of every word, line, and sentence of an elementary text-book.

The authors of the "Elementary Chemistry" say that the book does not profess to be a descriptive catalogue of chemical facts regarding the properties of the individual elements and compounds. But until a satisfactory practical elementary chemistry shall have been written, it is far better that students should gain simply an exact knowledge of chemical facts, and that in their practical work they should be guided by books which we all acknowledge to be sound, though we may think that they are far too restricted in range. Let each school purchase as many copies as possible of a grand old standard work such as Miller's large "Inorganic Chemistry," full of honest common-sense and all but free from fads, and let this serve as the book of reference. A fair understanding of the broad principles which underlie the science may be gained from books such as Cooke's "New Chemistry," and Wurtz's "Atomic Theory," both master-works in their way.

H. E. A.

CHINESE CIVILIZATION.

China: its Social, Political, and Religious Life. From the French of G. Eug. Simon. (London: Sampson Low and Co., 1887.)

THE reader who takes up this volume, expecting to find it an ordinary popular sketch of Chinese life and manners, similar to dozens of others which have gone by and dozens which are doubtless yet to come, will be totally mistaken. For in place of a colourless account of China—if any account of that wonderful country with its marvellous civilization could be written wholly devoid of colour,—and a jejune outline of the peculiarities of the Chinese, the reader will find here one of the most closely reasoned, original, and powerful defences of the Chinese social and political system that have ever been published in Europe. Writers of eminence, indeed, there have been who have selected some special peculiarity of Chinese religion, society, or politics, and have held it up to the West as worthy of imitation, and as a mark of profound wisdom; but M. Simon defends Chinese polity and civilization all along the line. He lived in China as a French official in the critical years succeeding the war of 1861-62; he travelled widely, and he observed keenly. This volume was not written in the first flush of pleasure and surprise at the strange and wonderful things he saw about him; he returned home, and has had ample time to correct first impressions, to review conclusions formed on the spot by the light of subsequent experience and knowledge, and years afterwards he is able to tell to the West that, as of old, the wise men still come from the East, and that the highest product of the human mind is to be found in the civilization of China. The most civilized

State is that "in which on a given area the largest possible number of human beings are able to procure and distribute most equally amongst themselves the most well-being, liberty, justice, and security." Measured by this standard, China is pronounced to be the most highly civilized country in the world, and the Chinese have this peculiarity—that, while modern nations are only the collateral successors of those of antiquity, China is the direct heir of the generations which created it. "Its history shows the phenomena of heredity in regular succession, neither modified nor obstructed by change of medium, with the evolution of events and ideas—an evolution as regular as that of living beings, freely proceeding unshaken and untroubled by any exterior influence, by which its direction might have been altered or its development retarded; and it is here, I repeat, that we find the deep and original interest of China, and perhaps also the secret of her extraordinary longevity." The book is a study of the progress and organization, in short of the civilization, attained by humanity under such conditions of liberty and development. The student in this case is full of love of his subject, and this no doubt is a great advantage, although it has its disadvantages also. M. Simon tells us of a land flowing with milk and honey, moral as well as material. Nothing that he has seen is inharmonious or out of place; everything is for the best, and has had the best effects. Chinese civilization is not a dead, rotten branch, as it is usually represented to be, but a living active power for good; in fact, "nowhere in the world is there such proof of force and vitality" as in the Chinese character and in Chinese civilization.

The book is divided into five parts: (1) the family; (2) labour; (3) the State; (4) the Government; (5) the Ouang-ming-tse family, in which he gives the history of the life, labours, and pleasures of a family with which he got acquainted in his travels, besides illustrating by a concrete instance how Chinese polity and administration work out in an individual case. With regard to the family, he says that it is at the hearth that the government of the country is carried on. The family has the power of passing judgment on any of its members for an offence, and can sentence the delinquent to whipping, exile, and excommunication. From the decision of the domestic tribunal an appeal is permitted to the ordinary courts of justice, but it is unusual for such an appeal to be made. Such is the respect paid by the Chinese to their traditions that there are few who do not submit at once to the sentence passed on them by their family. No punishment inflicted on a Chinaman can be more terrible than exclusion from the family. Socially he becomes an outcast, and, driven from the shelter of his ancestral home, and the protection of the spirits of his ancestors, he wanders in search of employment over the world, and it is the thousands of these abandoned ones who flood the American labour-markets. In the family, ancestral worship is cultivated, and is one of the strongest incentives to labour and progress: each member looks on himself as the guardian of posterity, toiling for their benefit, and satisfying the ancestors who watch over the family home. Each family religiously preserves the records of its ancestors, their lives and acts; and to the assembled members these records are read by the head of the house at regular intervals. At each meeting one

biography is read, then the next, and so on in order, till the last of the series is finished, when a commencement is again made with the first. With regard to these family records, M. Simon sees no more noble sign of the honesty and independence of the Chinese than the fact that, when any question is in dispute, an entry in one of these sacred family books referring to the dispute is looked on by the authorities as decisive. To be able to make the entries in this book, and to read it to his family, should he ever become its head, every Chinaman is taught to read and write; of this, in connection with education, we shall speak later on. Property is collective and individual; and the living holders look on themselves as the trustees of posterity. The fee-simple belongs to the community, except in a few fast-diminishing cases, where small portions of land are owned by each family, and are considered inalienable; and he who dares to introduce a stranger into this patrimonial land commits sacrilege, and becomes an outcast. China has been described as a despotic monarchy, but there is perfect liberty to all. Religions of all kinds are tolerated and are never interfered with except for political purposes. All public meetings and expressions of public opinion are freely permitted. To prove this, M. Simon says that in 1863 he made in one province a collection of proclamations of great virulence, denouncing the Emperor for agreeing to the treaty with the Europeans after the sack of the Summer Palace and the burning of the great library, and they are very numerous: none of the mandarins, he adds, dared to prosecute their authors. Taxation is very light—not one-hundredth part of what it is in France. With regard to legislation, the Academy of Sciences at Peking is the only legislative power. If any official thinks that a custom, generally observed in his province, might with advantage be used over the whole country, he sends an account of it to this body, which examines it, and, if it thinks the custom useful, orders it to be tried in the other provinces; if successful there, it is finally adopted, inscribed in the code, and becomes law. Though M. Simon reserves a more extensive account of education in China for another work, it is easy to gather his views from the present book. The Government gives full liberty to all to open schools. The children are well taught, and there is scarcely a Chinaman who is not able to read, write, add up accounts, and draw. The foundation of the education is laid in the family. From their earliest years, children are taught their duties and their rights. They are taught respect for others, and hence respect for themselves. Obedience to usages, humanity, justice, and right feeling—these are the foundations of their education. Besides the family education there are two kinds of public instruction,—primary and superior. Primary education is given in the institutions attached to the family temples, where there are such, or in private schools, which anyone is at liberty to open. The education of every child is provided for, apart from Governmental aid, the rich paying for their poorer brethren. Inasmuch as each Chinese sign conveys an idea, the child that is taught to write the Chinese characters learns not only words, but ideas, and he is forced to explain and comment on these to his teachers. And it is to this fact, in addition to the influences of family councils and family readings, with the profuse inscriptions in every public place, that M.

Simon ascribes the amazing intelligence and precocity of Chinese children. With regard to higher education, it is open to all. The Government give barely the necessary expenses; the rest is contributed by private donors and by the students themselves, of whom there is always an abundance. The directing staff is paid by Government, the teaching staff by the students. Those who wish to enter the public service are trained and examined at the Hanlin College or University of Peking. All appointments are given to the graduates according to their degrees; the higher the degree the more honourable and lucrative the post. The graduate takes precedence of all minor officials, and ranks with a minister or viceroy, whose post he frequently fills when he has had a little experience in public life. He has rooms allotted to him in the palatial universities. For these degrees the competition is very severe. All the professions stand on an equal footing, except those of teaching and letters. In no country is the man of letters of such influence as in China. Old age alone makes others as worthy of respect as he. Whenever M. Simon found the Chinese distrustful or indifferent to him, he always humoured this opinion of their value of learned men, by seeking out the most learned man in the place and paying his respects to him. The tutor retains a life-long power over his pupil, and frequently the people, when they have had some cause of complaint against an official, have sent long distances to bring his tutor to expostulate with him. The great goal of the literary man is to obtain a public post, such posts being held in high esteem in China. There are few vacancies, however, and the vast majority of candidates being unsuccessful become tutors, public writers, &c.; others turn their talents to commerce and agriculture, and so elevate the educational standard of the industrial classes. Labour is so honourable that handicraftsmen rank as high in public estimation as lawyers and doctors.

M. Simon sums up his views of Chinese civilization, of which a few examples have been given here, by stating that the fact which always seemed to him the most wonderful "was the progressive substitution of individual for collective action in all the works of civilization, from the simplest to the most complex, from mental to material. The individual freed from the slavery of collectivity, independent, and free in unity, thanks to that unity, is the salient fact apparent from the study of the relations between the people and the Government in China, and appears to me to justify the theories prevalent there." Very few readers who possess a personal acquaintance with China and the Chinese will be found to agree with all of M. Simon's statements of fact, or with all of his conclusions from them. But he has nevertheless produced a book which deserves to be carefully studied, and which will strike the mind by the originality of its propositions and the skill and ingenuity with which they are defended. In these days, when the Chinese are treated amongst many highly civilized communities in different parts of the globe with loathing and scorn, and when elective Legislatures do not hesitate to speak of members of the Chinese race as *hostes humani generis*, it is perhaps well to be reminded, as M. Simon forcibly reminds us, that this race has solved, apparently with success, some of the social and political problems before which Western statesmen and philosophers stand helpless.

THE METHOD OF CREATION.

The Creator, and what we may know of the Method of Creation. The Fernley Lecture of 1887. By W. H. Dallinger, LL.D., F.R.S. (London: T. Woolmer, 1887.)

IT is not the province of this journal to deal with theological questions; at the same time, the one discussed in this volume is in such close relation with science, and of such universal interest, that a brief sketch of Dr. Dallinger's argument may be permitted. He deals with a question which takes precedence of those sundering Churches—one which may briefly be stated thus: Have the recent advances in physical and biological science placed the Theist in an unreasonable position? Obviously this is a fundamental question. If the answer be in the affirmative, all investigations into the minutiae of theology are less than the shadows of a shade.

Dr. Dallinger commences by pointing out the necessary limits of scientific inquiry. On this he insists, not in any hostile spirit, but only because it is so often forgotten. "The researches of science are physical. The observable finite contents of space and time are the subjects of its analysis. Existence, not the cause of existence; succession, not the reason of succession; method, not the origin of method, are the subjects of physical research. A primordial cause cannot be the subject of experiment nor the object of demonstration. It must for ever transcend the most delicate physical reaction, the profoundest analysis, and the last link in the keenest logic. Absolute knowledge concerning it can only be the prerogative of itself."

This, of course, is a position which many so-called Agnostics would frankly accept. But in working out the argument the author indicates that a more definite creed is attainable. Commencing with the physical universe, he shows that whatever discoveries have been made, whatever simplifications introduced into the so-called laws of which it is the result, the physicist is at last arrested by two mysteries—matter and force. But what are these, "the alpha and omega of existence" as some would call them? They are two names, and nothing more. We deal with the properties or qualities of matter, with the consequences of force, but we are no nearer to knowing the one or the other. In addition to these, however, many hard-headed thinkers assert "the existence of a third thing in the universe—to wit, consciousness." Now we may juggle as we please with these terms, we may construct on them elaborate systems explanatory of the universe; but beyond laws either mechanical or vital there lies inevitably, however we may try to smother it by words, the idea of causation; and from this idea that of "volition" cannot be separated. We are, as the author shows in an elaborate argument, reduced at last to this alternative: "either chance or mental purpose gave primal origin to all that is." The former he shows is almost inexpressibly improbable: most men will not hesitate to accept the latter.

Considerable space is next devoted to a discussion of Mr. Herbert Spencer's view that "from matter in motion, and nothing else, the whole universe is supposed to arise; life emerges; and mind in its most transcendent forms comes forth." In this discussion we are again confronted